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(Food Substances.)

THE
AGRICULTURAL LEDGER.
1898—No. 19.

INDIGOFERA SP.

(WILD INDIGO.)

[DICTIONARY OF ECONOMIC PRODUCTS, Vol. IV., I. 121-36.]

WILD INDIGO SEED AS A FAMINE FOOD
IN BOMBAY AND BERAR.

Report on the Results of Examination of the Seeds at the Research Department,
Imperial Institute. By PROFESSOR A. H. CHURCH, M.A., F.R.S.

Other DICTIONARY article that may be consulted:

Famine Foods, Vol. III., P. 32.



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The objects of THE AGRICULTURAL LEDGER are :—

- (1) To provide information connected with agriculture or with economic products in a form which will admit of its ready transfer to ledgers;
- (2) To secure the maintenance of uniform ledgers (on the plan of the Dictionary) in all offices concerned in agricultural subjects throughout India, so that references to ledger entries made in any report or publication may be readily utilised in all offices where ledgers are kept;
- (3) To admit of the circulation, in convenient form, of information on any subject connected with agriculture or economic products to officials or other persons interested therein;
- (4) To secure a connection between all papers of interest published on subjects relating to economic products, and the official Dictionary of Economic Products. With this object the information published in these ledgers will uniformly be given under the name and number of the Dictionary article which they more especially amplify. When the subject dealt with has not been taken up in the Dictionary, the position it very possibly would occupy in future issues of that work will be assigned to it.

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WILD INDIGO SEED AS A FAMINE FOOD

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The fact that the grain afforded by certain species of Indigofera is eaten in years of scarcity is not new. The grains were largely consumed during the Deccan famine of 1877-78, and were described in a paper read by Dr. W. Gray before the Bombay Medical and Physical Society in 1859. The seeds were ground to flour and either alone or mixed with cereals they were made into cakes which were very palatable. They were occasionally eaten in a raw state when ill-effects supervened, but in all cases when properly prepared and cooked they afforded a nourishing food which had all the characters of pulse.

Food used
for food in
1877-78.

Preparation.

Origin of
Indigofera

From a letter addressed early this year to the Survey Commissioner and Director, Land Records and Agriculture, Bombay, and kindly communicated by him to the Reporter on Economic Products, it appears that during 1897, a year of great scarcity in India, a considerable number of the people of Majlisrao and Pandharpur in the Bombay Presidency, were subsisting on these grains.

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The Survey Commissioner in drawing attention to the subject (letter No. a-353, dated 5th February 1898) forwarded small samples of the grain mentioned. These proved to have been correctly described by the Commissioner as *Indigofera comosa*, I. *glandulosa*, and I. *hirsutifolia*. A second supply consisting of 5lb of the seeds of each plant was subsequently received from the Survey Commissioner.

The Reporter pointed out that if it was intended that the grains should be chemically investigated by Professor A. H. Church, a supply of 8 or 10lb of each kind would be required. The additional quantity would allow of a duplicate specimen being placed in the Indian Section of the Imperial Institute.

The Survey Commissioner in replying to this request, drew attention to the fact that the grains had already been analysed by Professor Lyon, Chemical Examiner of Bombay, and enclosed a copy of analysis of these and other seeds made in 1882. The Reporter explained that "the further samples now desired are intended to be sent to the Imperial Institute, London, where Professor Church is conducting an examination of Indian Food Grains on a special plan of his own in which he brings out very prominently the nutrient ratio for comparative purposes." In compliance with this request the Survey Commissioner kindly promised to collect and send samples of the wild grains in question after the monsoon when they would be available.

Samples of the seeds mentioned above were forwarded to the Secretary and Curator, Indian Section, Imperial Institute, in the month of March 1898. At the same time 1lb of each kind of seed was sent to the Royal Gardens, Kew, for exhibition in the Economic Museum.

It is a strange coincidence that on the 25th March 1898, Sir F. A. Abel wrote to the Reporter and drew his attention to these very seeds, stating that Professor Church considered the Indigoferas worthy of attention, and hoped it would be possible to send specimens for analysis.

It was evidently found practicable to investigate the grains with the material sent to the Imperial Institute in March, since Sir F. A. Abel wrote on 7th October 1898, F. S. S. 154, enclosing a Report by Professor A. H. Church on the three Indian Food-stuffs under reference.

In Bombay and Poona (A. H. Chark) INDIGOFERA SP.

Relating to each section of the Report is given certain information furnished through the Survey Commissioner and Director, Land Recorded Agriculture, Bombay, regarding the manner in which the grain was prepared for food.

The analysis by Professor Lyon, referred to in the foregoing review, is also given for the purpose of comparison.

Indigofera cordifolia, Heyne.

Vernacular.—*Vetrikas (Marmara), Raj.; Gedadi Bedage, Belgaum, Bour.*

The mode of preparing the grain of *Indigofera cordifolia* (vern. *Bachha*) for food is the same as that followed in the case of *Indigofera glandulosa*. Of the three *Indigoferas* herein described, this one is stated to be consumed the least.

Professor Lyon's analysis as quoted at page 891 of Dr. Dymock's *Vegetable Materia Medica of Western India*, second edition, is as follows :—

	Average cereal.	Average pulse.	Indigofera cordifolia.
Water	11.62	10.00	5.28
Fat	3.00	3.50	5.83
Albuminates *	9.12	25.06	35.91
Carbo-hydrates	71.26	51.30	29.34
Cellulose	3.00	7.14	18.90
Ash	8.00	3.60	5.41
* Containing nitrogen (per cent.)	1.46	4.01	5.68
Nitrogen (grains per oz.) . . .	6.38	17.85	24.25
Nutritive carbon (grains per oz.) . . .	170.00	178.00	141.00
Percentage of nutritive value as compared with—			
Average cereal	100.00	...	...
Average pulse . . . . .	...	100.00	13.60

CHEMICAL
TESTS

Ques. 2. 6.

Analysis by
Professor
Lyon.

The Agricultural

INDIGOFERA SP.

Wild Indigo Seed as a Famine Food

DIVISIONAL
OFFICER'S
FILE

Copy No.
7888.

Report on the Results of Examination of Seeds of Indigofera cordifolia, by Professor A. H. CHURON, M.A., F.R.S.

The seeds of this wild indigo are eaten in times of scarcity and famine. They are very small, 100 weighing less than one grain. When suddenly heated they 'pop' like maize. On analysis these percentages were obtained:—

Water	• • • • •	• • •	6·1
Albuminoids (from total nitrogen)	• • •	• •	30·8
Soluble carbo-hydrates (by difference)	• • •	• •	46·0
Oil	• • • • •	• • •	1·3
Fibre	• • • • •	• • •	11·2
Ash	• • • • •	• • •	4·6

The nutrient-ratio is here 1; 1·6 and the nutrient-value 79. The percentage of albuminoids by the phenol method was identical with the above-given figure.

Indigofera glandulosa, Willd.

Vernacular.—*Vekhariyo*, MAR.; *Barbed*, SHOLAPUR; *Gavacha*, *walmendi*, KALADGI, BONB.; *Vekhariyo*, *Baragadam*, *Barapatalu*, *Boomidapu*, TEL.

Bombay:
Mode of
preparing
for food.

Cowt. p. c.

Berar:
Seeds
ground and
eaten.

Plant used
for fodder.

In preparing *Indigofera glandulosa* (vern. *Badbad*) for food in Bombay the grain is first pounded, then ground like *Bajji* and made into bread. The taste of this bread is somewhat bitter. It is, therefore, made and eaten in the same manner as *Indigofera linifolia* (vern. *Pandharphali*).

The seed is also eaten in the Hyderabad Assigned Districts. Under instructions from the Conservator, H. A. D., the Divisional Forest Officer of Buldana District forwarded in April last 10 seers of the grain and reported as follows: "This grain grows wild all over the District in the waste fields. The seed was largely used during the famine of 1897 for grinding into flour, and the plants themselves for camel fodder. I can supply 100 seers of the seed if you want." The plant is known in Berar as *Barbati* or *Jungli-methi*. *Methi* is the vernacular for Fenugreek (*Trigonella Foenum-graceum*) a plant of the same natural order.

The following is Professor Lyon's analysis, *Vegetable Materials*
Native of Western India, second edition, p. 892 :—

	Average cereal.	Average pulse	Indigofera glandulosa.	Comparative values of Analysis by Professor Lyon.
Water	11.68	10.00	8.91	
Fat	3.00	3.50	...	
Albuminoids	9.12	8.506	24.35	
Carbo-hydrates	71.36	51.90	48.21	
Cellulose	3.00	7.14	16.00	
Ash	2.00	3.00	2.63	
" Containing nitrogen per cent.	1.46	4.01	3.88	
Nitrogen (grains per oz.)	6.38	17.86	16.97	
Nutritive carbon (grains per oz.)	17.000	17.000	16.10	
Percentage of nutritive value as compared with—				
Average cereal	100.00	...	...
Average pulse . . . . .	...	100.00	95.00	

Professor Church reports as follows on the sample of *Indigofera glandulosa* :—

The seed of this wild indigo is rather larger than that of *Indigofera cordifolia* and much resembles that of *Indigofera unifolia*. 100 seeds of the analysed sample weighed 4½ grains. These are the percentages obtained :—

Water	8.2
Albuminoids (from total nitrogen)	31.9
Soluble carbo-hydrates (by difference)	45.7
Oil	2.2
Fibre	7.8
Ash	3.8

The nutrient-ratio is here 1 : 1.6 and the nutrient-value 83. The percentage of albuminoids by the phenol method was 29.3%.

Indigofera unifolia, Rox.

Vernacular.—Turki, Hinn, and Pa.; Bhawra, Bung.; Tendi Kheda baba, SANTAL; Barburra, Pendhari pale, Bhangra, Turki, Boma; Pandhi, Narm; Jawarish mal, Mandi, Kaladgi, Boma.

Report by
 Professor
 Church.
 Reg. No.
 10837.

The Agricultural Ledger.

AGRICULTURAL
LEADER.

Wild Indigo Seed as a Famine Food.

Report by
Professor
Lyon.
Analysed
in
London.

Analysed by
Professor
Lyon.

Report by
Professor
Church.

Bog. No.
10386.

Indigofera Tinctoria (vern. *Pandharphali*) is prepared for food in the following manner : The flour of the grain with the husk removed by pounding is made into bread. This bread has a somewhat bitter taste and is, therefore, eaten with vegetables or hot condiments. To make the bread palatable *Bajri* or *Jowari* is mixed with the grain before grinding in the proportion of 1 : 3. If bread be prepared of this grain without first pounding it and be eaten continuously for some days it causes swelling of the mouth or body.

Professor Lyon's analysis* is given below :—

	Average cereal.	Average pulse.	Indigofera Tinctoria.
Water	11.62	10.00	5.00
Fat	3.00	3.50	3.94
Albuminoids	9.12	25.06	33.29
Carbo-hydrates	71.26	51.90	20.05
Cellulose	3.00	7.14	33.90
Ash	2.00	3.00	3.73
+ Containing nitrogen per cent.		1.46	4.01
Nitrogen (grains per oz.)	6.38	17.86	23.49
Nutritive carbon (grains per oz.)	170.00	170.00	130.10
Percentage of nutritive value as compared with—			
Average cereal : : : : .	100.00	...	...
Average pulse : : : : .	...	100.00	76.50

* Vegetable Materia Medica, Western India, second edition, p. 391.

Professor Church's report on the seeds of *Indigofera Tinctoria* is as follows :—

The seeds of this common kind of wild indigo are eaten in times of scarcity and famine. They are a little smaller than those of *Indigofera glandulosa*. The percentages obtained were :—

Water	9.3
Albuminoids (from total nitrogen)	34.3
Soluble carbo-hydrates (by difference)	43.4
Oil	3.0
Fibre	6.5
Ash	3.5

The nutritive ratio is here 1 : 1.47; the nutritive value is 84. The phenol method showed 33.2 per cent. of albuminoids.

I. 121-36.

G. E. C. P. O. No. 446 R. & A.-6-3-9.—9.223.—W. B. G.

All communications regarding THE AGRICULTURAL LEDGER should be addressed to the Editor, Dr. George Watt, Reporter on Economic Products to the Government of India, Calcutta.

The objects of this publication (as already stated) are to gradually develop and perfect our knowledge of Indian Agricultural and Economic questions. Contributions or corrections and additions will therefore be most welcome.

In order to preserve a necessary relation to the various Departments of Government, contributions will be classified and numbered under certain series. Thus, for example, papers on Veterinary subjects will be registered under the Veterinary Series; those on Forestry in the Forest Series. Papers of more direct Agricultural or Industrial interest will be grouped according as the products dealt with belong to the Vegetable or Animal Kingdom. In a like manner, contributions on Mineral and Metallic subjects will be registered under the Mineral Series.

This sheet and the title-page may be removed when the subject-matter is filed in its proper place, according to the letter and number shown at the bottom of each page.